Validator Provided

Certified Validation Report

Audit Information:

Water Supplier Name: City of Chino Hills PWS ID: 3610036

System Type: Potable Audit Period: Fiscal Year 2017-2018

Utility Representation: Cheryl Yeamans, Jacob Loukeh

Validation Date: 9/27/18 Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 57 Data Validity Band (Level): Level III (51-70)

ILI: 0.02 Real Loss: 0.28 (gal/conn/day) Apparent Loss: 3.32 (gal/conn/day)

Non-revenue water as percent of cost of operating system: 0.6%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

If not, rejected recommendations are included here.

Validator Information:

Water Audit Validator: Mark Wiley Qualifications: Certified AWWA Water Loss Validator

Certified Validation Report

Utility Provided

Water Supplier Name: City of Chino Hills **Water Supplier ID Number:** 3610036 **Water Audit Period:** Fiscal Year 2017-2018

Water Audit & Water Loss Improvement Steps:

Utility to provide steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

The City created a GIS position and hired an employee to address inaccuracies and update mapping and technical pipeline data. City staff identified a leaking potable storage reservoir and had it repaired. Over-age meter replacement is continuing on a 15 year cycle for all size potable meters, with approximately 1,400 meters exchanged during the audit period. Water meters have been installed on all vehicles that use City system water (water trucks, vactors, etc.). The City hired a contractor to replace corroding saddles that will be reflected in next year's audit. For the second half of the audit period, City owned wells were taken off-line due to the new MCL for TCP. The City is now 100% reliant on purchased water from the State, and two neighboring water agencies. A City staff member received certification in audit validation from the AWWA.

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audit and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Executive Name (Print)	Executive Position	Signature	Date
Nadeem Majaj, P.E.	Director of Public Works and Engineering		9/27/18

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Validity Grade
1	Volume from Own Sources	VOS	5	Supply meter profile: Operate 4 own wells, two of which feed same meter, equating to three production meters. VOS input derived from: Manual reads from production meters as archived. Comments: No meter test documentation, due to wells off-line. Recycled Water not included confirmed.	Percent of own supply metered: 100% Signal calibration frequency: N/A Volumetric testing frequency: Annual, N/A Volumetric testing method: Pitot Tube Percent of own supply tested and/or calibrated: 100% Comments: Wells off-line due to contamination, did not have tested during audit period.
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	Input derivation: 3 Net Storage change included in MMSEA input: No Comments: No additional comments	Supply meter read frequency: Daily Supply meter read method: Manual and automatic logging. Frequency of data review for trends & anomalies: Monthly Storage levels monitored in real-time: Yes Comments: No additional comments
3	Water Imported	WI	5	Import meter profile: Water is imported from three agencies: WFA, CDA and MVWD. MVWD and WFA flows through two common meters maintained by MVWD. WI input derived from: Totalization of volumes per daily meter reads from importer and exporter. Comments: No supporting documentation, MVWD confirms no meter testing occurred during audit period.	Percent of import supply metered: 100% Signal calibration frequency: Annually for CDA Volumetric testing frequency: Annually for CDA Volumetric testing method: Pitot Percent of import supply testes and/or calibrated: 25% Comments: Only CDA tests and calibrates their meters, default input was used as it is a small percentage of total import.
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	4	Input derivation: Left blank in absence of test. Comments: No additional comments.	Imported meter read frequency: Daily Imported meter read method: Manual and automatic data logging. Frequency of data review for trends and anomalies: Monthly Comments: No additional comments
5	Water Exported	WE	n/a		
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	n/a		
7	Billed Metered	BMAC	5	Customer meter profile: Master Meter Manufacturer Age profile: Meters range in age up to 15 years Reading System: AMR	Percent of customers metered: 100% Small meter testing policy: Reactive – complaint based or flagged consumption testing only.

				Read frequency: Monthly Comments: Lag- time correction is not determined in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Number of small meters tested/year: Not quantified but known to be small. Large meter testing policy: Reactive – complaint based or flagged consumption testing only. Number of large meters tested/year: Not quantified but known to be small. Meter replacement policy: Customer meters are replaced every 15 years. Number of replacements/year: Entire meter stock was replaced in 2004-05, replacement is cycling back. Billing data auditing: Standard billing QC, plus review of volumes by use type each billing cycle. Comments: No additional comments
8	Billed Unmetered	BUAC	n/a		
9	Unbilled Metered	UMAC	9	Profile: Includes street sweepers, vactor and water trucks, flushing. Input derivation: Direct from monthly meter reads. Comments: Input derivation from supporting documents confirmed.	Policy for billing exemptions: Own facilities plus other exemptions including street sweepers, vactors and water trucks. Comments: No additional comments.
10	Unbilled Unmetered	UUAC	3	Profile: Includes Fire Department usage. Comments: Custom California default of .25% used.	Comments: Default grade applied.
11	Unauthorized Consumption	UC	5	Comments: Default input applied.	Comments: Default grade applied.
12	Customer Metering Inaccuracies	CMI	3	Input derivation: Rudimentary estimate Comments: See BMAC regarding meter testing & replacement activities.	Characterization of meter testing: Limited (upon request and consumption flag only). Characterization of meter replacement: Customer meters are replaced every 15 years. Comments: No additional comments.
13	Systematic Data Handling Errors	SDHA	5	Comments: Default input applied.	Comments: Default grade applied.
14	Length of Mains	LM	3	Input derivation: Total from GIS based Map. Hydrant leads included: Not Included. Comments: No additional Comments.	Mapping format: Digital Asset management database: In place but separate from GIS. Map updates & field validation: Field validation does not regularly take place. Comments: The City hired a dedicated GIS staff person to address deficiencies this audit period.

15	Number of Service Connections	NS	9	Input derivation: Standard report run from billing system. Basis for database query: Account ID, Non- premise based. Comments: Inactive connections are included.	CIS updates & field validation: Accomplished through normal meter reading process. Approximately 100 re-reads occur monthly. Estimated error of total count within: Less than 1% Comments: No additional comments.
16	Average Length of Cust. Service Line	LP	10	Comments: Default input applied.	Comments: Default grade applied.
17	Average Operating Pressure	AOP	3	Number of zones, general profile: Operate four pressure zones with 53 PRV's Typical pressure range: 24-160 PSI Input derivation: Rudimentary Estimate Comments: No additional comments.	Extent of static pressure data collection: Hydrant flow test and pressures are collected at the request of residents and Fire Department personnel. Characterization of real-time pressure data collection: Real-time monitoring limited to reservoir levels. Hydraulic model: None currently in place. Comments: No additional comments.
18	Total Annual Operating Cost	TAOC	10	Input derivation: From official financial reports Comments: Confirmed costs limited to water only, water service and CIP included.	Frequency of internal auditing: Annually Frequency of third-party CPA auditing: Annually Comments: No additional comments.
19	Customer Retail Unit Cost	CRUC	9	Input derivation: All rate classes included. Comments: Customers are billed on three tiers.	Characterization of calculation: This number was derived by dividing the total volume-based revenues by the total volume of potable water delivered in CCF Comments: No additional comments.
20	Variable Production Cost	VPC	7	Supply profile: Own sources and import supply. Primary costs included: Imported & treatment costs. Secondary costs included: Power Comments: No additional comments.	Characterization of calculation: Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.

Key Audit Metrics

(~) VALIDITY Data Validity Score: 57 Data Validity Band (Level): Level III (51-70)

(#) VOLUME ILI: 0.02 Real Loss: 0.28 (gal/conn/day) Apparent Loss: 3.32 (gal/conn/day)

($) VALUE Annual Cost of Real Losses: $7,494 Annual Cost of Apparent Losses: $87,410

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Average infrastructure age generally falls around 30 years, and a small amount of infrastructure is 50+ years in age.
Infrastructure replacement policy (current, historic): Due to corrosive soils, infrastructure is replaced with PVC, any buried metallic appurtenances are wrapped in plastic.
Estimated main failures/year: 22 Estimated service failures/year: 45
Extent of proactive leakage management: The City is proactively replacing mild steel saddles with bronze saddles in problematic areas. A leaking potable reservoir was identified and repaired.
Other water loss management comments: Soils are highly corrosive and severely impact infrastructure.

Comments on Audit Metrics & Validity Improvements

The infrastructure Leakage Index (ILI) of .02describes a system that experiences leakage at .02 times the modeled technical minimum for its system characteristics. This number is unrealistic and should be higher. The City should consider having the Monte Vista Water District calibrate and test their import meters, it seems apparent that they are under registering.

The Data Validity Score falling within Band III (51-70) suggests that next steps may be focused simultaneously on improving data reliability and evaluating interventions for water and revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- **Water Imported** – Since WFA and MVWD water flow through the same meters maintained by MVWD, it is encouraged to have the meters annually tested and calibrated.
- **Customer Metering Inaccuracies** – The City may want to consider a customer meter testing program which tests a sample of random meters whose stratification (size, age) represents the entire meter stock.
- **Billed Metered** – Same recommendation as Customer Metering Inaccuracies